

AMENDMENTS TO THE CLAIMS:

This listing of claims will replace all prior versions, and listings of claims in the application:

LISTING OF CLAIMS:

1. (original) Process for determining the mechanical resistance of a bone from a digitized two dimensional image, obtained by imaging, characterized in that there is carried out a correlation between the bone mineral density determined from this two dimensional image by any means suitable to this type of image and a structural parameter obtained from the same two dimensional image.

2. (original) Process for determining the mechanical resistance of a bone according to claim 1, characterized in that one has recourse to a correlation of the exponential type.

3. (currently amended) Process for determination according to claim 1 ~~or~~ 2, characterized in that the correlation associating the bone mineral density and said structural parameter is used to determine the ultimate stress  $C_u$  of the bone.

4. (original) Process for determining the mechanical resistance of a bone according to any one of the preceding claims, characterized in that there is determined the structural parameter  $\alpha$  obtained by the series of the following steps:

- a) choosing at random a pixel of the two dimensional image which is at the gray level  $h(0)$ ,
- b) choosing a straight line from this point having a direction also determined at random,

- c) moving a distance  $\underline{r}$  along this straight line,  $h(r)$  being the gray level of this new point,
- d) computing the variance of the gray levels with the formula:  $V(r) = [h(r) - h(0)]^2$ ,
- e) tracing the curve associated with  $V(r)$  on a log-log scale, and
- f) determining the slope of this log-log curve which represents said parameter  $\underline{\alpha}$ .

5. (original) Process for determining the mechanical resistance of a bone according to claim 4, characterized in that steps a) to d) are repeated a number of times sufficiently great to make the mean variance function  $V(r)$  converge over the assembly of the repetitions.

6. (currently amended): Process for determining the mechanical resistance of a bone according to claim 4 ~~or 5~~, characterized in that there is carried out a correlation between the bone mineral density obtained from this two dimensional image and said parameter  $\underline{\alpha}$  evaluated from the same two dimensional image according to the mathematical model:

$$C_u' = b_0 + b_1 * \exp (b_2 * DMO) * \alpha$$

- wherein  $b_0$ ,  $b_1$ ,  $b_2$  are coefficients obtained by nonlinear regression and  $C_u'$  the prediction of the ultimate stress  $C_u$  of the bone.

7. (currently amended): Process for determining the mechanical resistance of a bone according to ~~any one of claims 4, 5 or 6~~ claim 4, characterized in that there is determined a correlation between the parameter  $\underline{\alpha}$  and a three dimensional parameter of the trabecular network of the bone.

8. (original): Process for determining the mechanical resistance of a bone according to claim 7, characterized in that

the three dimensional parameter of the trabecular network of the bone is the connectivity density  $\chi_v$

9. (new): Process for determining the mechanical resistance of a bone according to claim 5, characterized in that there is carried out a correlation between the bone mineral density obtained from this two dimensional image and said parameter  $\alpha$  evaluated from the same two dimensional image according to the mathematical model:

$$C_u' = b_0 + b_1 * \exp (b_2 * DMO) * \alpha$$

wherein  $b_0$ ,  $b_1$ ,  $b_2$  are coefficients obtained by nonlinear regression and  $C_u'$  the prediction of the ultimate stress  $C_u$  of the bone.

10. (new): Process for determining the mechanical resistance of a bone according to claim 5, characterized in that there is determined a correlation between the parameter  $\alpha$  and a three dimensional parameter of the trabecular network of the bone.

11. (new): Process for determining the mechanical resistance of a bone according to claim 6, characterized in that there is determined a correlation between the parameter  $\alpha$  and a three dimensional parameter of the trabecular network of the bone.

12. (new): Process for determination according to claim 3, characterized in that the correlation associating the bone mineral density and said structural parameter is used to determine the ultimate stress  $C_u$  of the bone.